

FORM PTO-1390 (Modified)  
(REV 10-95)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371

11594-002001

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

09/509926

INTERNATIONAL APPLICATION NO.  
PCT/EP98/06255INTERNATIONAL FILING DATE  
1 October 1998PRIORITY DATE CLAIMED  
1 October 1997

TITLE OF INVENTION

PREASSEMBLED ELEVATOR SHAFT

APPLICANT(S) FOR DO/EO/US

WITTUR, Horst

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
  - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☒ has been transmitted by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ A copy of the International Search Report (PCT/ISA/210).
8. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
  - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ have been transmitted by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☒ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☒ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 18 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.  
A **SECOND** or **SUBSEQUENT** preliminary amendment.
16. ☐ A substitute specification.
17. ☐ A change of power of attorney and/or address letter.
18. ☒ Certificate of Mailing by Express Mail
19. ☐ Other items or information:

"Express Mail" label number: EL445347462US

Date of Deposit : 3 April 2000

I hereby certify that under 37 CFR 1.10 that this correspondence is being deposited with the United States Postal Service as "Express Mail Post Office To Addressee" with sufficient postage on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

*Samantha Bell*  
Samantha Bell

U.S. APPLICATION NO. (IF KNOWN), 37 CFR

INTERNATIONAL APPLICATION NO.

ATTORNEY'S DOCKET NUMBER

09/509926

PCT/EP98/06255

11594-002001

20. The following fees are submitted:

**BASIC NATIONAL FEE ( 37 CFR 1.492 (a) (1) - (5) ) :**

- ☐ Search Report has been prepared by the EPO or JPO ..... \$840.00
- ☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) ..... \$670.00
- ☐ No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) ..... \$760.00
- ☒ Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO ..... \$970.00
- ☐ International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) ..... \$96.00

**ENTER APPROPRIATE BASIC FEE AMOUNT =****CALCULATIONS PTO USE ONLY**

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total claims	18 - 20 =	0	x \$18.00
Independent claims	1 - 3 =	0	x \$78.00

Multiple Dependent Claims (check if applicable) . ☐**TOTAL OF ABOVE CALCULATIONS =**

Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) (check if applicable) . ☐

**SUBTOTAL =**

Processing fee of \$130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).

**TOTAL NATIONAL FEE =**

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). ☐

**TOTAL FEES ENCLOSED =**

Amount to be:  
refunded \$  
charged \$

☒ A check in the amount of \$970.00 to cover the above fees is enclosed.

☐ Please charge my Deposit Account No. \_\_\_\_\_ in the amount of \_\_\_\_\_ to cover the above fees.  
A duplicate copy of this sheet is enclosed.

☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. 06-1050 A duplicate copy of this sheet is enclosed.

**NOTE:** Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

TSAO, Y. Rocky  
Fish & Richardson P.C.  
225 Franklin Street  
Boston, Massachusetts 02110-2804  
United States of America

SIGNATURE

Y. Rocky TSAO

NAME

34,053

REGISTRATION NUMBER

4-3-00

DATE

527 Rec'd PCT/RTQ 03 APR 2000

## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Horst Wittur                          Art Unit :  
Serial No. :    Examiner :  
Filed : **3 April 2000**  
Title : PREASSEMBLED ELEVATOR SHAFT

Box PCT  
Assistant Commissioner for Patents  
Washington, D.C. 20231

Int'l Application No.: PCT/EP98/06255  
Int'l Filing Date: 1 October 1998

## PRELIMINARY AMENDMENT

The present application claims priority from PCT/EP98/06255 and its corresponding German applications. Note that the amendments are based on Amendments made under Article 34, rather than International Patent Application PCT/EP98/06255 as filed.

Prior to examination, please amend the application as follows:

In the Claims:

In claim 4, line 1, delete “or 2”.

In claim 5, line 1, replace “one of the preceding claims” with -- claim 1 --.

In claim 6, line 1, replace “one of the preceding claims” with -- claim 1 --.

In claim 7, line 1, replace “one of the preceding claims” with -- claim 1 --.

In claim 8, line 1, replace “one of the preceding claims” with -- claim 1 --.

In claim 9, line 1, replace “one of the preceding claims” with -- claim 1 --.

In claim 10, line 1, replace “one of the preceding claims” with -- claim 1 --.

In claim 12, line 1, replace “one of the preceding claims” with -- claim 1 --.

CERTIFICATE OF MAILING BY EXPRESS MAIL

Express Mail Label No. EL445347462US

I hereby certify under 37 CFR §1.10 that this correspondence is being deposited with the United States Postal Service as Express Mail Post Office to Addressee with sufficient postage on the date indicated below and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

Date of Deposit 3 April 2000

Date of Deposit \_\_\_\_\_  
Signature Samantha Bell

Signature Samantha Bell  
Typed or Printed Name of Person Signing Certificate

In claim 13, line 1, replace "one of the preceding claims" with -- claim 1 --.

In claim 14, line 1, replace "one of the preceding claims" with -- claim 1 --.

In claim 15, line 1, replace "one of the claims 1 to 12" with -- claim 1 --.

In claim 16, line 1, replace "one of the claims 1 to 12" with -- claim 1 --.

In claim 17, line 1, replace "one of the claims 1 to 12" with -- claim 1 --.

In claim 18, line 1, replace "one of the preceding claims" with -- claim 1 --.

REMARKS

Applicants have amended the dependency of the claims to preclude a rejection under 35 U.S.C. § 112, fifth paragraph, which provides in part that "[a] multiple dependent claim shall not serve as a basis for any other multiple dependent claim." No new matter has been added by the above amendments.

Claims 1-18 are now pending. Prompt examination of the present application, as amended, is respectfully requested.

Please apply any other charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

Date:

4-3-00

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Translation of amended documents submitted September 22, 1999

## PRE-ASSEMBLED ELEVATOR SHAFT

The present invention pertains to cable elevators as described by the preamble of patent claim 1.

Elevator systems in which the elevator cabin is lifted or lowered by cables are sufficiently known. A common way of action therein lies in arranging the required elements, like guide rails for the elevator cabin as well as deflection sheaves for the cables etc. within an elevator shaft. This way of action is not only quite expensive as a plurality of individual elements have to be transferred to the respective mounting position, have to be arranged there individually and have to be connected with the remaining elements of the elevator, but also is essentially unsuitable for the subsequent equipment of old buildings with elevator systems, as no elevator shafts at all are existing in which the individual elements of the elevator system to be assembled could be arranged.

In order to be able to erect an elevator or to subsequently equip the housing with such one in spite of the lacking elevator shaft, the US patent US-

A-3880258 provides that a self-supporting shaft scaffold is erected out of vertical and horizontal and vertical beams by plugging into one another individual modules consisting of vertical and horizontal beams step-by-step, i.e. one above the other, whereby a self-supporting shaft scaffold is created. On this self-supporting shaft scaffold the guide rails are fixed from the inside. These guide rails, however, only have a guide function. A load-reducing function is not taken over by the guide rails in this construction. Such erection of a self-supporting shaft scaffold thus is comparatively expensive in material and work, since after erection of the complete shaft an additional working cycle for fixation of the guide rails is required.

It, therefore, is the object of the present invention to create an elevator system which is independent from an elevator shaft provided for in a housing, which can be easily manufactured as well as being assemblable economically and which in spite of the reduced material expense for the manufacture of the supporting structure also is flexible in particular in arrangeability of the drive or also the cable sheaves, for e.g. answering the most different installation demands in modernization projects.

This object is solved by the characterizing features of patent claim 1, preferred embodiments being described by the subclaims.

An elevator apparatus is provided for in which the essential elements for operating the elevator, including the cable guide, deflection sheaves and drives are assembled in module-shaped mounting frames. In accordance with the present invention said mounting units therein can be connected to form a self-supporting shaft scaffold which can be held on a house wall. The guide elements for the cabin and the guide elements for the counterweight form vertical beams of the shaft scaffold. By connecting them with the mounting frames forming the horizontal beams of the shaft scaffold, a self-supporting shaft scaffold is created with low material expense.

Simultaneously there are good possibilities for adaptation to the respective individual installment situation. Thus, e.g. in adaptation to the respective individual case in can be chosen which mounting frame is to be the one which accommodates the drive. In addition, there are manifold possibilities to individually define in which way and manner the respective elevator components, the drive and the cable sheaves are to be mounted on the mounting frame. Thus, there is the possibility of mounting within as well as also outside of the shaft cross-section bordered by the module-shaped mounting elements. Simultaneously, such a self-supporting shaft scaffold for an elevator can serve as support element for a protective lining in that lining plates are mounted thereon.

The module-shaped mounting elements therein preferably are delivered as pre-assembled units to the place of installation and there are assembled only.

Further features and advantages of the present invention result from the following description of the attached drawing, wherein:

Fig. 1 is a top view onto an embodiment of the present invention with two disc engines located on bottom;

Fig. 2 is a side view of the embodiment shown in Fig. 1;

*pages 3 to 11 as well as Figs. 1 to 17 of the originally filed documents to follow*



gine, special engine, flat engine or any other possible drive unit, wherein said drive a/o. can be disposed e.g. vertically on or in said shaft wall or house wall in front of which said shaft scaffold is mounted.

Fig. 2 shows a partial side view of the embodiment to be taken from Fig. 1 of the present invention. Corresponding elements therein are provided with corresponding reference numbers. From Fig. 2 the connection in particular of the individual segments of the said vertical guide elements 3 and 4 by said module elements 6 can be taken, said segments of said guide elements 3 and 4 engaging at the working face like groove and tongue and being fixed to said mounting frame 6 using fixation means like screws 11 or the like. Therein Fig. 2 shows a so-called 1:1 embodiment. I.e. the loads (the cabin and the counterweight) to be lifted or lowered, respectively, each are fixed to one end of said flat belt or cable. Neither cabin nor the counterweight are suspended in block and pulley (no block and pulley effect is realized). A drive not shown which acts on said driving disks in accordance with the embodiment under Fig. 1 is disposed in the area of said lower mounting frame 6 together with said driving disks 7. I.e. here the embodiment "drive on bottom" is realized.

A drive (not shown) which in accordance with the embodiment under Fig. 1 acts onto said driving disks 7 can in modification of the embodiment shown in Figs. 1 and 2 be arranged in the most different positions of the shaft scaffold formed by said guide elements 3 and 4 and said mounting frame 6,

i.e. on the lower mounting frame 6 and on the upper mounting frame 6 as well as also on a further mounting frame possibly to be provided for as well as within or outside of the elevator shaft formed by said shaft scaffold.

Fig. 2a shows a partial side view of an embodiment which came into existence from a modification of Fig. 1. In this embodiment the 1:1 principle is realized. However, the drive 7 not shown, now is arranged on said upper mounting frame together with said driving disks, the principle "drive on top" is realized.

A further modification is shown in Fig. 2b. Here, the drive not shown as well as driving disks 7" again are disposed on said lower mounting frame (principle "drive on bottom"), but here the so-called 2:1 principle is realized. Both ends of the elevator cable or flat belt are fixed to the building. Said elevator cabin as well as said counterweight are suspended in block and pulley, i.e. the so-called block and pulley effect is made use of.

Fig. 2c shows a further modification. This embodiment as well works under the so-called 2:1 principle. In this embodiment, however, the drive not shown together with the relating driving disks 7" again is located in said upper mounting frame 6, i.e. the principle "drive on top" is realized.

In the embodiment shown in Fig. 3 the engine is located outside of the elevator shaft formed by said shaft scaffold of the kind as described with respect to Figs. 1 and 2, wherein, however, also arrangements of the drive 12 in the middle between said two driven driving disks 7 or in any other arbitrary position between said driving disks 7 are possible. The embodiment of Fig. 3 differs from the embodiment also with respect to the number as well as the arrangement of said cable sheaves 13 to 16 via which again the cable or flat belt required for lifting and lowering said cabin 1 as well as said counterweight 5 is guided.

Fig. 4 shows a further embodiment of the present invention. In difference to the embodiments under Fig. 3 said cable sheaves 16 are substituted for by a cable sheave 17 fixed to said counterweight 5. The drive again is effected using driving disks 7 which are driven by a shaft 18 connecting them, said drive being arranged in the middle between said driving disks 7 on said shaft 18. In the embodiment shown in Fig. 3 the drive 12 therein is seated in the area of a lower mounting frame 6. It also is conceivable to arrange said drive 12 in the area of said upper mounting unit 6 which together with said guide elements 3 and 4 as well as said upper mounting units 6 form said shaft scaffold for the elevator.

Fig. 5 in schematic view shows an embodiment in accordance with the invention, in which said elevator cabin 1 is arranged in rucksack-like man-

ner in front of the means of up- and downward movement of said elevator cabin 1. All means for moving said elevator cabin 1 as well as said counter-weight 5 in upward and downward direction within said elevator shaft 1a therein are combined in a mounting unit 6 which can be flatly disposed in front of the rear wall of said elevator shaft, wherein in Fig. 5 only said driving disk 7 is shown schematically. Said driving disk 7 in the embodiment shown in Fig. 5 instead of a driving disk can also be a ring engine. However, a drive with gear also is conceivable, wherein drive and/or gear are located in the rear wall of said elevator shaft 1a and wherein the perforated plate principle is made use of.

Fig. 6 in schematic way shows a cable sheave 19 mounted in a mounting frame 6. On said mounting frame 6 in addition a preferably regulated cable brake 20 is arranged which runs in mesh with a brake disk 21 fixed to said cable sheave 19.

Fig. 7 in schematic way shows a cable sheave 22 rotatably arranged on a mounting frame 6 and preferably protruding upwardly through an opening 23 in the latter. Brake blocks 24 are disposed on both sides of said opening 23. In case of axial failure of said cable sheave 22 the latter is pulled in upward direction by the load of the elevator acting on said cables 25 into contact with said brake blocks 24 such that emergency braking of the elevator is effected. Fig. 8 shows a top view onto the arrangement under Fig. 7.

The further figures elucidate advantageous measurements for arranging the drive. Therein the drive can always be fixed outside of the "shaft cross-section" defined by said mounting frame, when the demand of optimum utilization of space requires fixation within the shaft cross-section defined by said mounting frame. Said mounting frames and said guide rails therefore will not be shown in the following, as the different manners of fixation are known to the expert.

Fig. 9 in a side view shows an elevator system with an elevator cabin 1h which is guided in lateral guides not shown, within said elevator shaft. Said elevator cabin 1h in accordance with the embodiment shown in Fig. 9 is lifted and lowered using a drive 3h which may be a so-called flat engine, a disk engine or a driving disk. The drive therein acts on a cable or flat belt 4h which, as shown, is anchored with both ends 4h1 and 4h2 at the ceiling of said elevator shaft (2:1 principle). Said cable or flat belt 4h therein runs from its first anchoring point 4h1 on the ceiling of said elevator shaft over a first sheave 5h located below said elevator cabin 1h to a second sheave 6h also located below said elevator cabin 1h and from there to a sheave 7h disposed below the ceiling of said elevator shaft. Said cable or flat belt 4h again is deflected by said sheave 7h and is guided within said elevator shaft in downward direction to said drive 3h and again is guided around the latter, wherein looping of said drive 3h of approximately three quarters of the

circumference can be achieved by a correspondingly arranged further deflection sheave 8h. From said sheave 8h said cable or flat belt 4h again leads in upward direction to a deflection sheave 9h also disposed below the ceiling of said elevator shaft and from there horizontally to a further deflection sheave 10h. From said deflection sheave 10h said cable or flat belt 4h is guided in downward direction to a deflection sheave 12h located at a counterweight 11h, wherefrom said cable or flat belt 4h again leads in upward direction to said second fixation point 4h2 on the ceiling of said elevator shaft.

Fig. 10 shows the same elements as Fig. 1, but in top view onto the arrangement.

In Fig. 11 an alternative embodiment of the course of said cables or flat belts for upward and downward movement of said elevator cabin 1k is shown (also 2:1 principle). Herein, the axes of rotation of said flat engine 3k as well as of said deflection sheave 8k being in direct efficiency contact with said flat engine 3k are arranged at right angle to the axis of rotation of the deflections sheaves 5k and 6k disposed on the bottom side of said elevator cabin as well as to the axis of rotation of said deflection sheave 12k on said counterweight 11k as well as to the axis of rotation of said deflection sheaves 13k and 14k in operation rotating in opposite directions. In the modification shown in Fig. 11 of the course of said cable or flat belt 4k for lifting and lowering said elevator cabin 1k one deflection sheave has been saved as compared to the

embodiment under Fig. 9, as said deflection sheaves 7k, 9k and 10k of Figs. 9 and 10 are substituted for by deflection sheaves 13k and 14k under Fig. 11.

Fig. 12 shows a further modification of the course of said cable or flat belt 4l for lifting and lowering said elevator cabin 1l (also 2:1 principle). Herein, the orientation of the axes of rotation of said flat engine 3l as well as of said deflection sheaves 5l, 6l, 8l, 12l, 13l and 14l is in the same direction. Said deflections sheaves as well as said flat engine therein preferably are located in the same plane, this permitting a flat and room-saving arrangement out of flat engine and counterweight outside of the area of said elevator cabin itself.

Fig. 13 in schematic view shows the possible arrangement of said flat engine 3m as well as the relating deflection sheave 8m, as shown in the embodiments in accordance with Figs. 9 to 12, in a possible positioning within a breaking-through of an elevator shaft wall 15m, wherein said breaking-through in the shown embodiment is provided with a bordering profiled frame 16m. The arrangement of flat engine 3m and deflection sheave 8m in said elevator shaft wall 15m can therein be provided for on the level of the underground floor or any other floor. Alternatively thereto, however, a positioning in the lateral door area on each floor or, however, in a shaft pit in front of said elevator shaft is conceivable. Said flat engine 3m therein simultaneously also serves as brake.

The embodiment of the preceding Figs. 9 to 13 having a cable or flat belt 4h-m for lifting and lowering said elevator cabin 1h-m, which is fixed on the ceiling of said elevator shaft with both ends permits an essentially arbitrary arrangement of the individual elements of said elevator with respect to one another, whereby good accessibility of the drive units and thus simple assembly as well as maintenance can be guaranteed.

Fig. 14 shows a further embodiment of the invention, in which a drive with two driving disks 17n and 18n separately or commonly driven by a connecting shaft is provided for. In contrast to the embodiment shown in Figs. 9 to 13, under the modifications under Figs. 14 to 16 of a further embodiment an elevator cabin is not lifted and lowered by a cable or flat belt fixed with both ends to the ceiling of said elevator shaft and which runs over deflection sheaves and a flat drive, but by two cables or flat belts 27n1 and 27n2 arranged in mirror-inverted manner with respect to one another. Therein, the ends respectively are fixed to a frame 19n on which an elevator cabin is to be suspended as well as to a counterweight 26n (thus the so-called 1:1 principle is realized). Between these two ends said cables or flat belts, respectively, 27n1 and 27n2 run over said deflection sheaves 21n and 23n or 20n and 22n, respectively to a driving disk 18n or 19n and from there over a deflection sheave 25n or 24n to said counterweight 26n. Said deflection sheaves 21n to 25n therein are fixed under the ceiling of an elevator shaft not shown, directly



or via one or several frames, wherein the axes of rotation of said deflection sheaves 24n and 25n over which said cables or flat belts 27n1 and 27n2 run to said counterweight 26n are arranged at right angle to the course of the axis of rotation of the remaining deflection sheaves 20n to 23n.

Fig. 15 essentially shows the same arrangement as can be seen from Fig. 14, however, said cables or flat belts 27p1 and 27p2 leading from said deflection sheaves 20p and 21p directly to said driving disks 17p and 18p, wherein said deflection sheaves 22n and 23n can be saved as can be seen from Fig. 14.

Fig. 16 finally shows a further modification of the embodiments under Figs. 14 and 15, wherein in addition to said deflection sheaves 20n to 25n to be seen from Fig. 14 (here 20q to 25q) further deflection sheaves 28q and 29q are provided for and said deflection sheaves 24q and 25q are disposed on the opposite side of said driving disks 17q and 18q seen with respect to the frame 19q, the axis of rotation of said deflection sheaves 24q and 25q corresponding to the orientation of the axes of rotation of said deflection sheaves 20q to 23q as well as 28q and 29q. Thus, the drive and/or said driving disks, respectively, 17q and 18q as well as said counterweight 26q can be arranged on the opposite sides of said frame 19q and/or said elevator cabin, respectively, suspended thereon.

Fig. 17 shows a further embodiment of the invention, a drive 31s being arranged on the bottom side of an elevator cabin 1 (guide not shown) guided in an elevator shaft 33s, said drive acting on a cable or a flat belt 30s which is fixed on point 30s1 on the ceiling of said elevator shaft 33s as well as on point 30s2 on the bottom of said elevator shaft 33s. For achieving sufficient looping of said drive 31s preferably embodied as flat engine, an additional deflection sheave 32s is therein arranged below said elevator cabin 1.

Of course, also a combination of the individual features of the shown embodiments is possible.

PATENT CLAIMS (amended)

1. Elevator with a drive moving an elevator cabin (1) running in an elevator shaft as well as a counterweight (5) in upward and downward directions in effective connection with a cable or flat belt guided over cable sheaves, **characterized in that** said elevator cabin is arranged within a self-supporting shaft scaffold whose vertical girders are formed by the segmental guide elements (3) for said cabin (1) and the segmental guide elements (4) for a counterweight (5) and whose horizontal girders are formed by module-shaped mounting frames (6) which are connected to said guide elements (3 and 4).
2. Elevator as defined in claim 1, **characterized in that** it has an elevator drive which is arranged within an elevator shaft and lifts and/or lowers an elevator cabin as well as a counterweight in said elevator shaft by at least one bending-flabby means guided over an arrangement of deflection sheaves, wherein said drive is integrated into the arrangement of deflection sheaves as element deflecting said bending-flabby means.
3. Elevator as defined in claim 1, **characterized in that** said driven or freely rotating deflection sheaves required for lifting and lowering said elevator cabin (1) and said counterweight (4) are mounted in said pre-assembled mounting frames (6).

4. Elevator as defined in claim 1 or 2, **characterized in that** said pre-assembled mounting frames (6) are made out of squared sheets.
5. Elevator as defined in one of the preceding claims, **characterized in that** said vertical guide elements (3, 4) are segmented, said segments engaging at a working face (10) like groove and tongue.
6. Elevator as defined in one of the preceding claims, **characterized in that** said working face (10) of said segmented guide elements (3, 4) is disposed in the area of said mounting frames (6), each respective mounting frame (6) serving as connecting element for the respective segments of said guide elements (3, 4).
7. Elevator as defined in one of the preceding claims, **characterized in that** said drive consists of separately driven driving disks.
8. Elevator as defined in one of the preceding claims, **characterized in that** at least two of said cable sheaves (7) can be made rotate by a drive by a full floating axle or hollow shaft.

9. Elevator as defined in one of the preceding claims, **characterized in that** said drive is formed with gear, without gear, as ring engine, as disk engine, as special engine or flat engine.
10. Elevator as defined in one of the preceding claims, **characterized in that** said drive is arranged outside of said elevator shaft formed by said mounting frames (6) as well as said vertical guide elements (3, 4).
11. Elevator as defined in claim 6, **characterized in that** said drive is arranged within said elevator shaft formed by said mounting frames (6) as well as said vertical guide elements (3, 4).
12. Elevator as defined in one of the preceding claims, **characterized in that** on at least one of said mounting frames (6) a regulated cable brake running in mesh with a brake disk (20) fixed to a cable sheave arranged in said mounting frame is arranged.
13. Elevator as defined in one of the preceding claims, **characterized in that** on at least one of said mounting frames (6) an emergency brake coming into engagement with a cable sheave in case of failure of the axis of said cable sheave arranged in said mounting frame.

14. Elevator as defined in one of the preceding claims, **characterized in that** said drive is arranged on the level of a floor or underground floor exit of said elevator shaft.
15. Elevator as defined in one of the claims 1 to 12, **characterized in that** said drive is arranged in a shaft pit in front of said elevator shaft.
16. Elevator as defined in one of the claims 1 to 12, **characterized in that** said drive is arranged on said elevator cabin.
17. Elevator as defined in one of the claims 1 to 12, **characterized in that** said drive is arranged on a counterweight.
18. Elevator as defined in one of the preceding claims, **characterized in that** the bending-flabby means is a flat belt.

## ABSTRACT

## Cable elevator

An elevator is provided which has a drive which in effective connection with a cable guided over deflection sheaves moves an elevator cabin running in an elevator shaft, as well as a counterweight in upward and downward directions, wherein deflection sheaves, drive sheaves as well as guide elements are combined in pre-assembled mounting units which can be quickly and easily assembled in the place of use.

In addition, said elevator comprises a drive which lifts and/or lowers an elevator cabin as well as a counterweight by at least one bending-flabby means guided over an arrangement of deflection sheaves, wherein said drive is incorporated into said arrangement of deflection sheaves as element deflecting said bending-flabby means.

Fig. 1

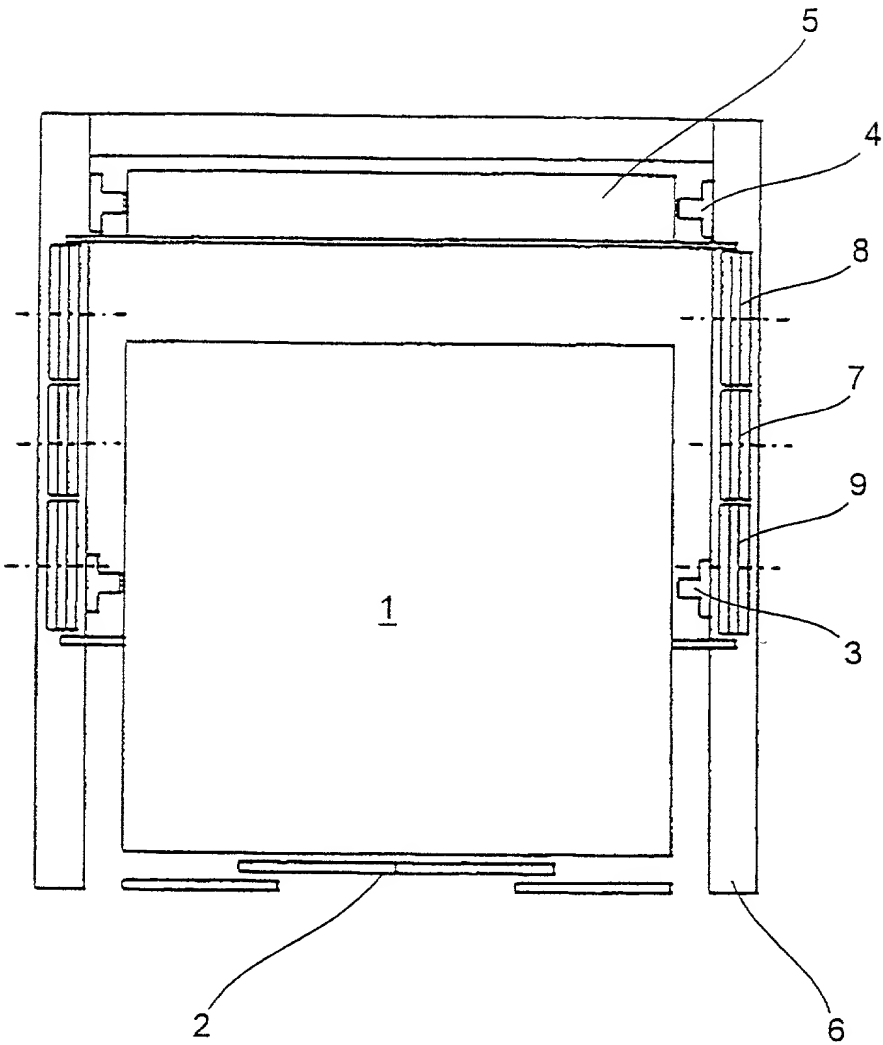




Fig. 2

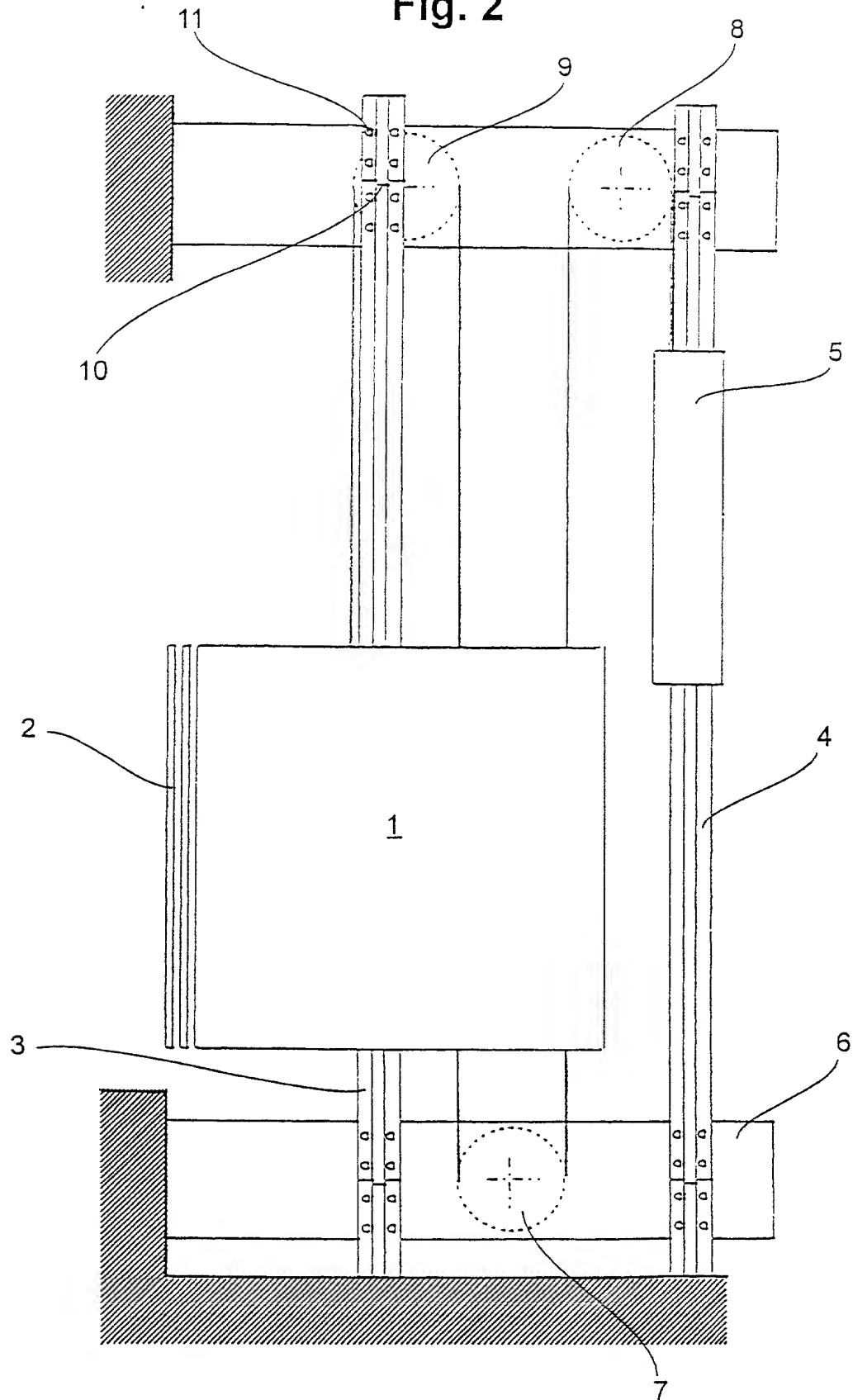
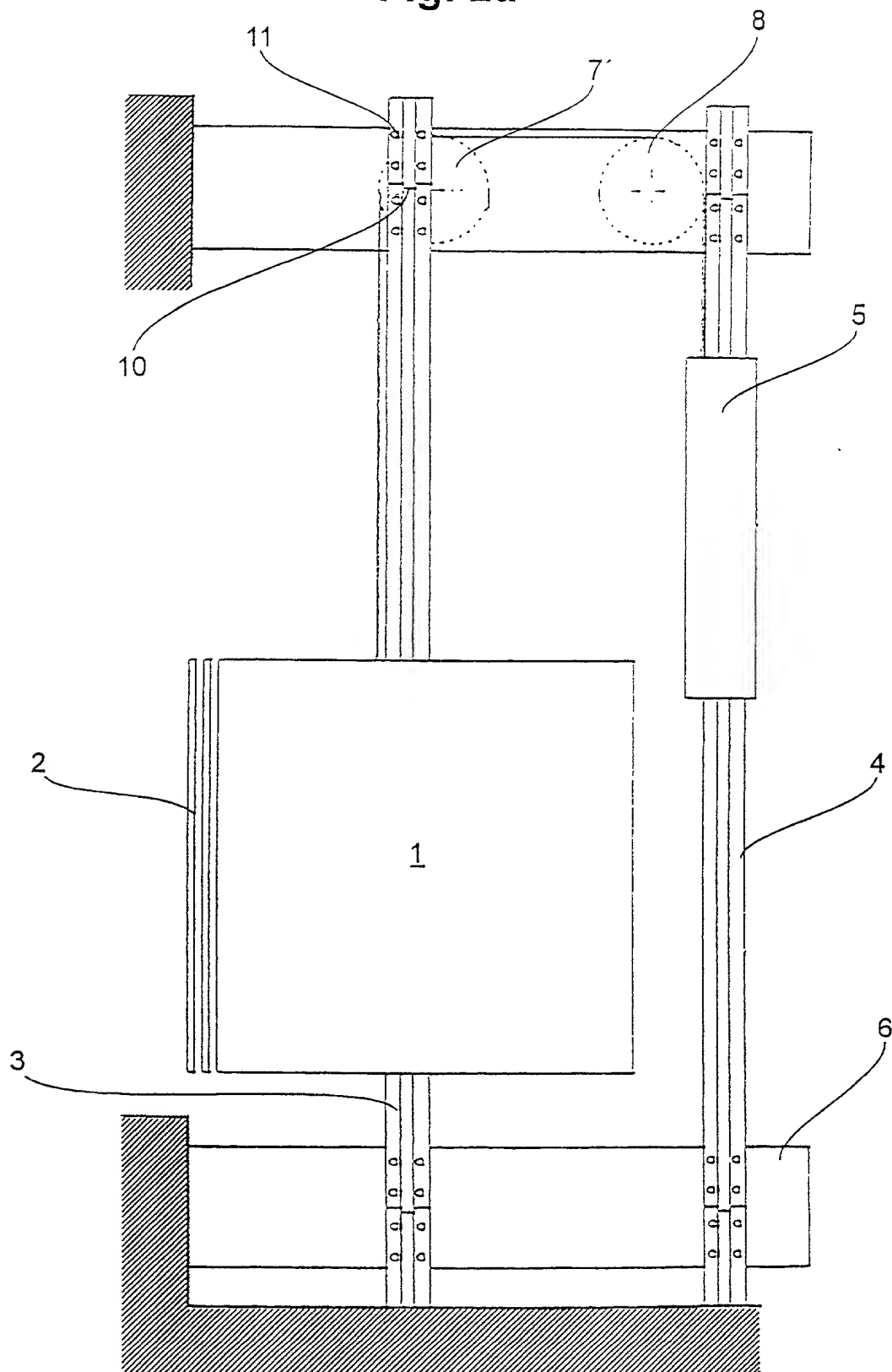
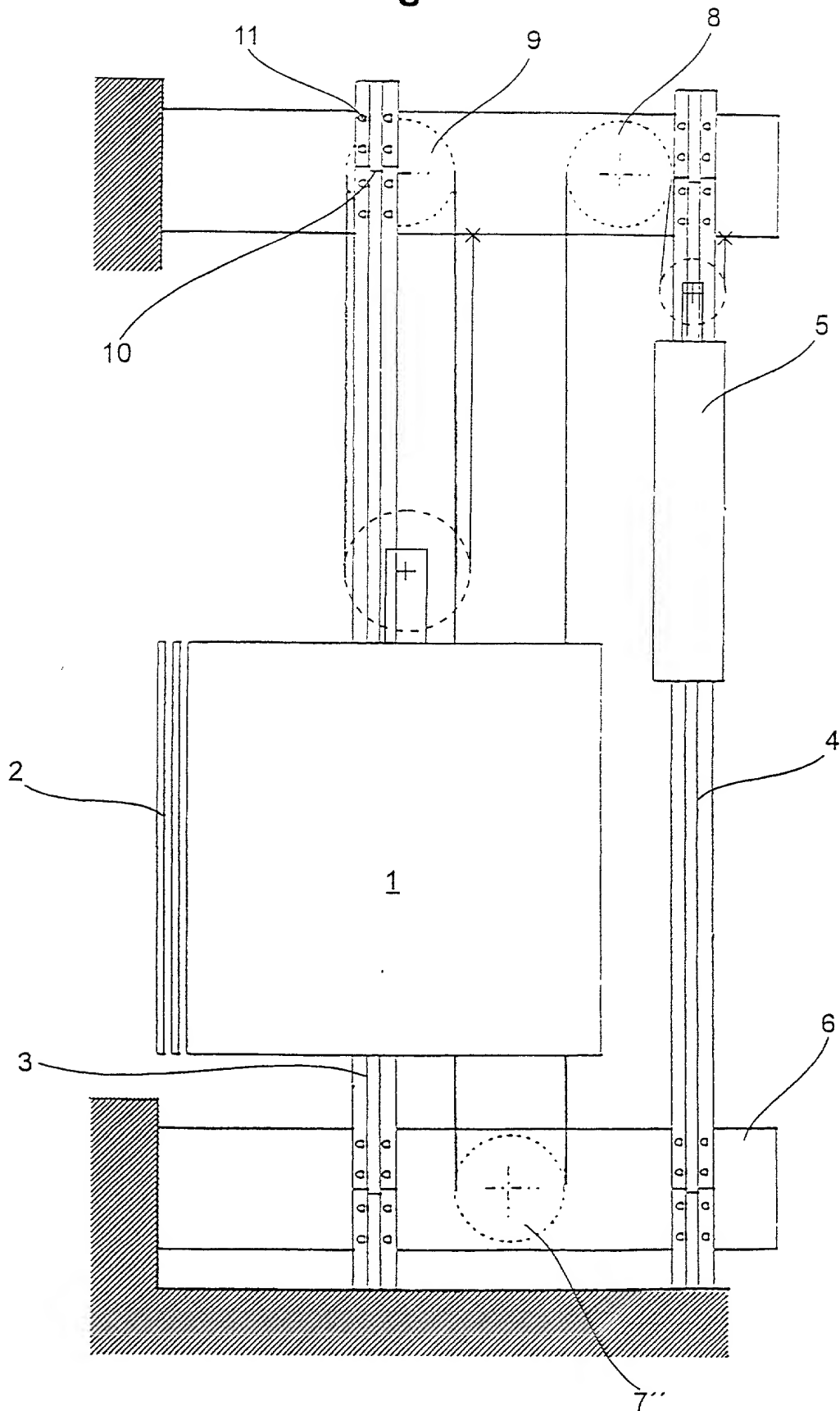


Fig. 2a



**Fig. 2b**



**Fig. 2c**

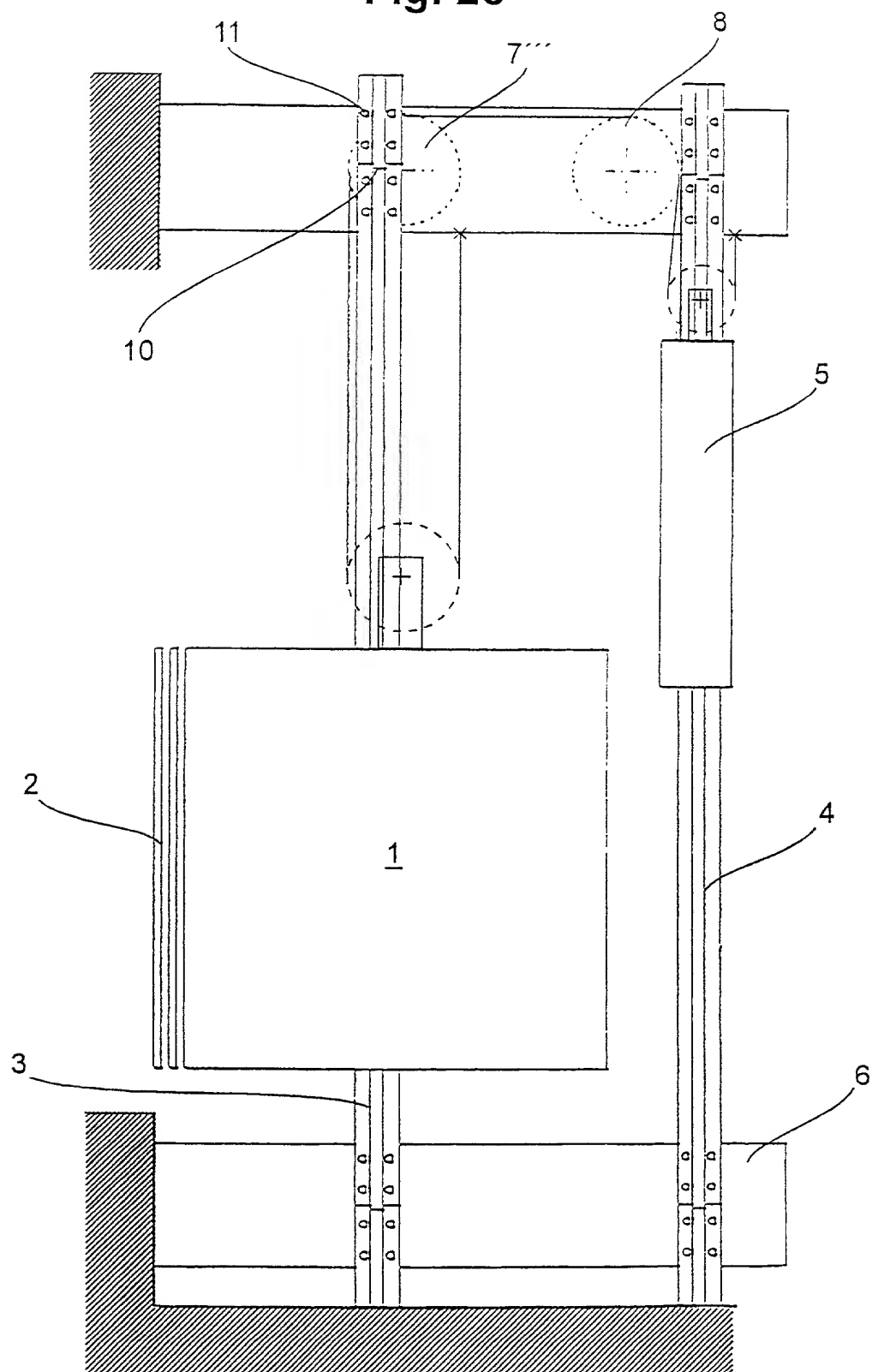


Fig. 3

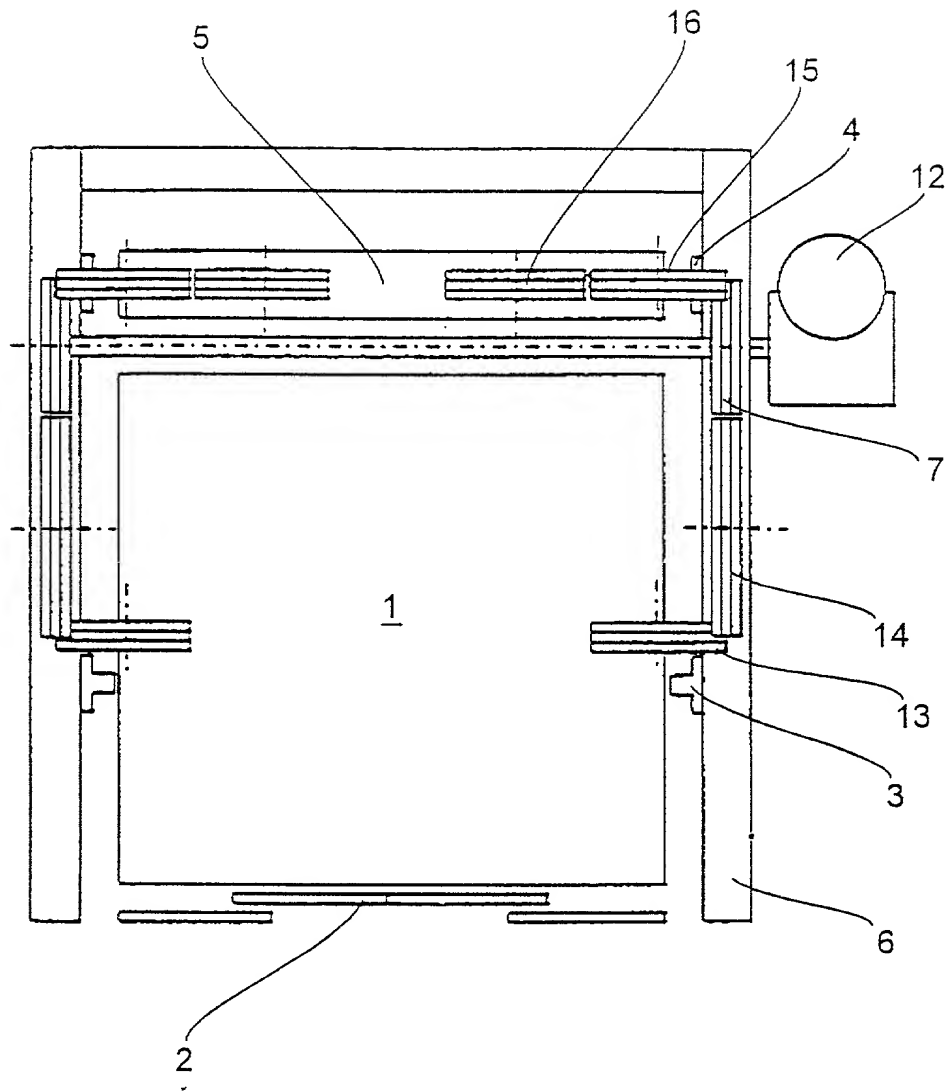


Fig. 4

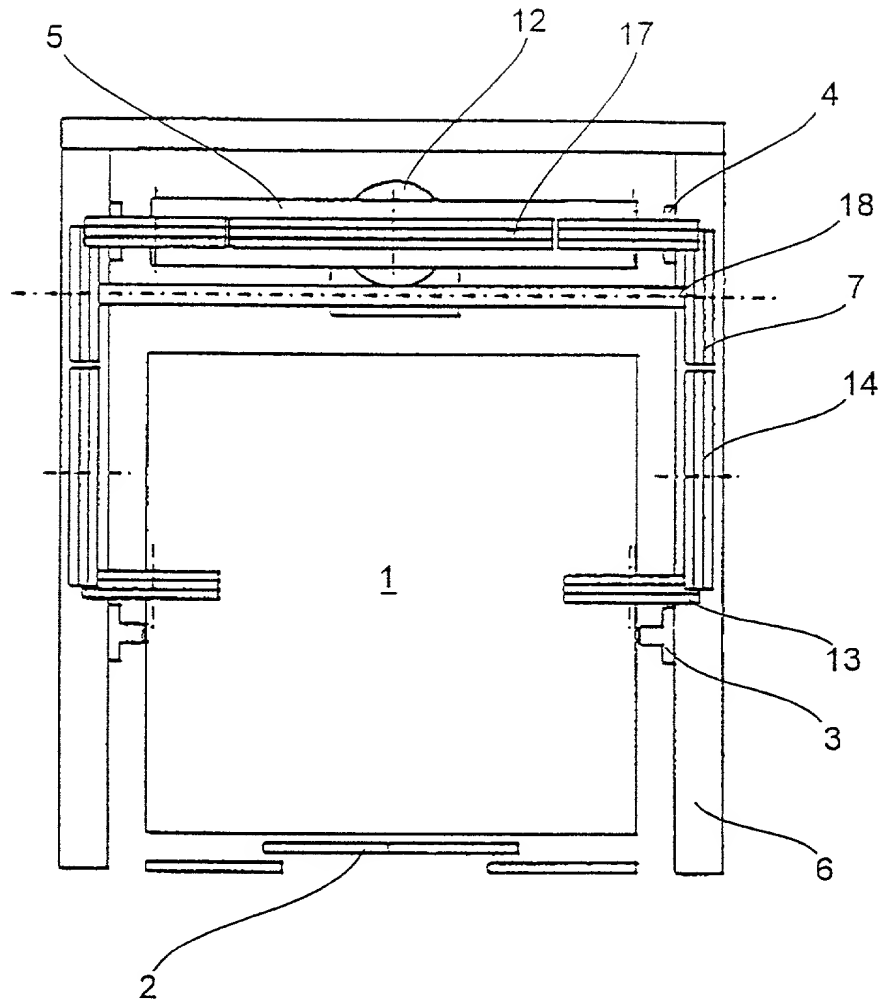


Fig. 5

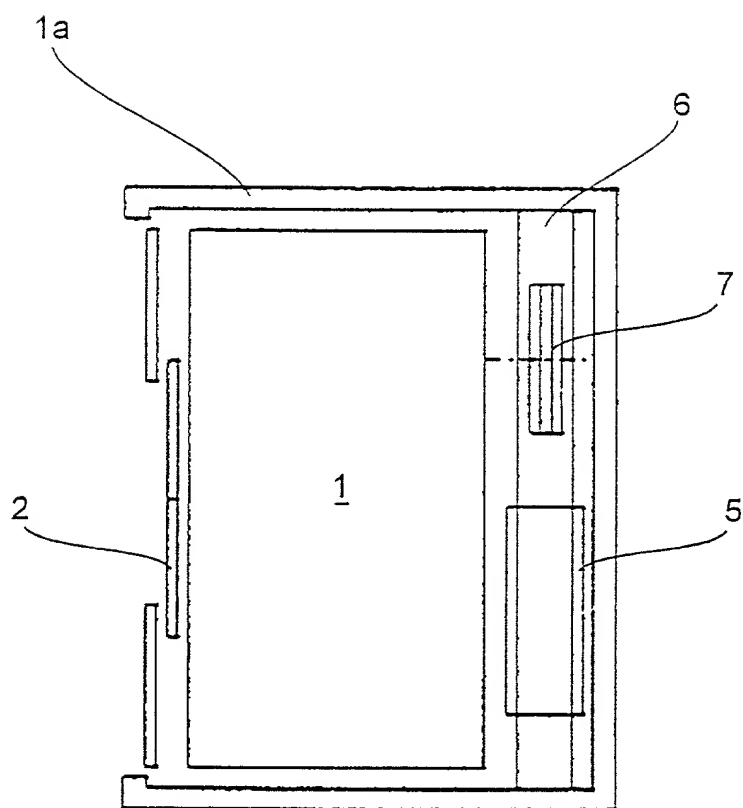


Fig. 6

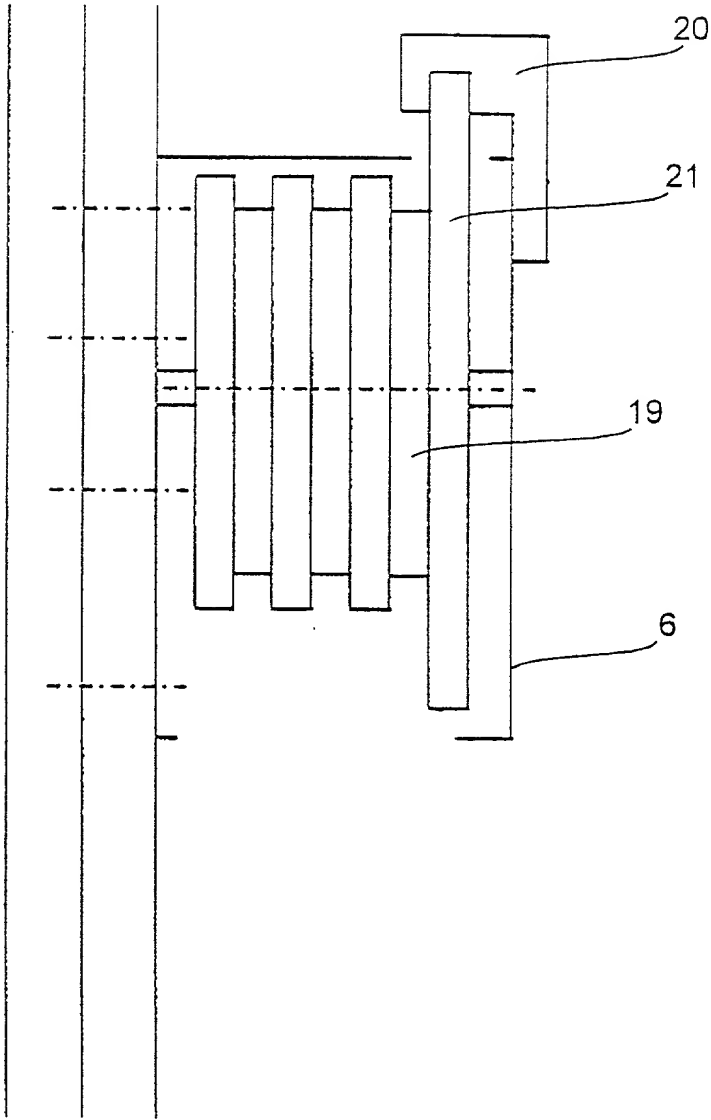




Fig. 7

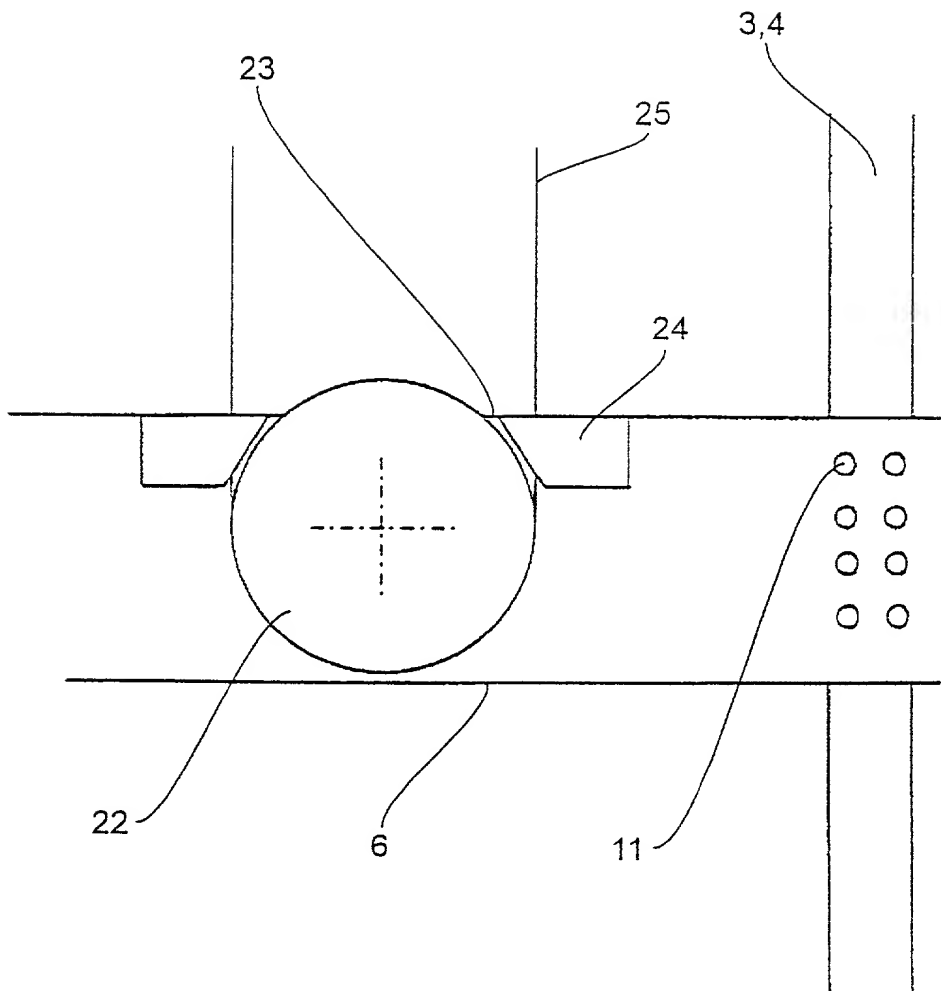


Fig. 8

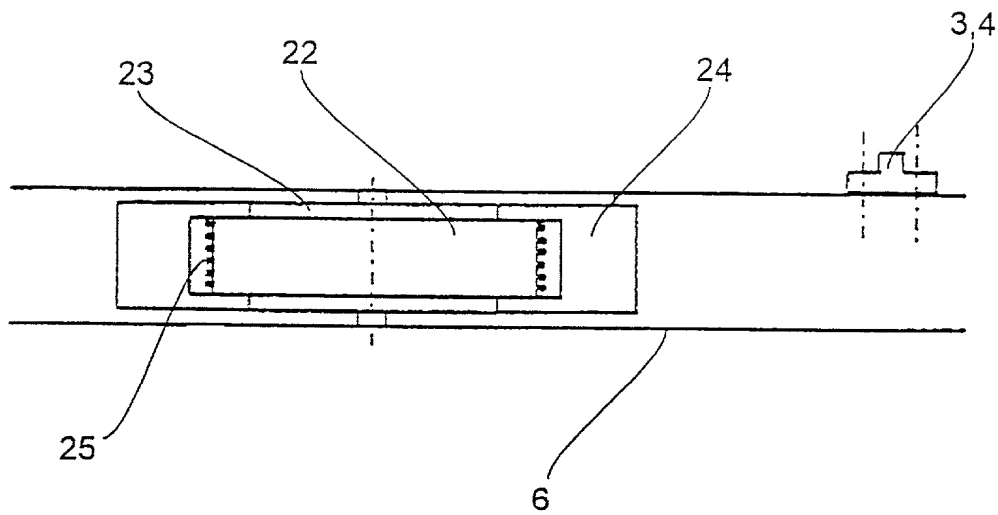


Fig.9

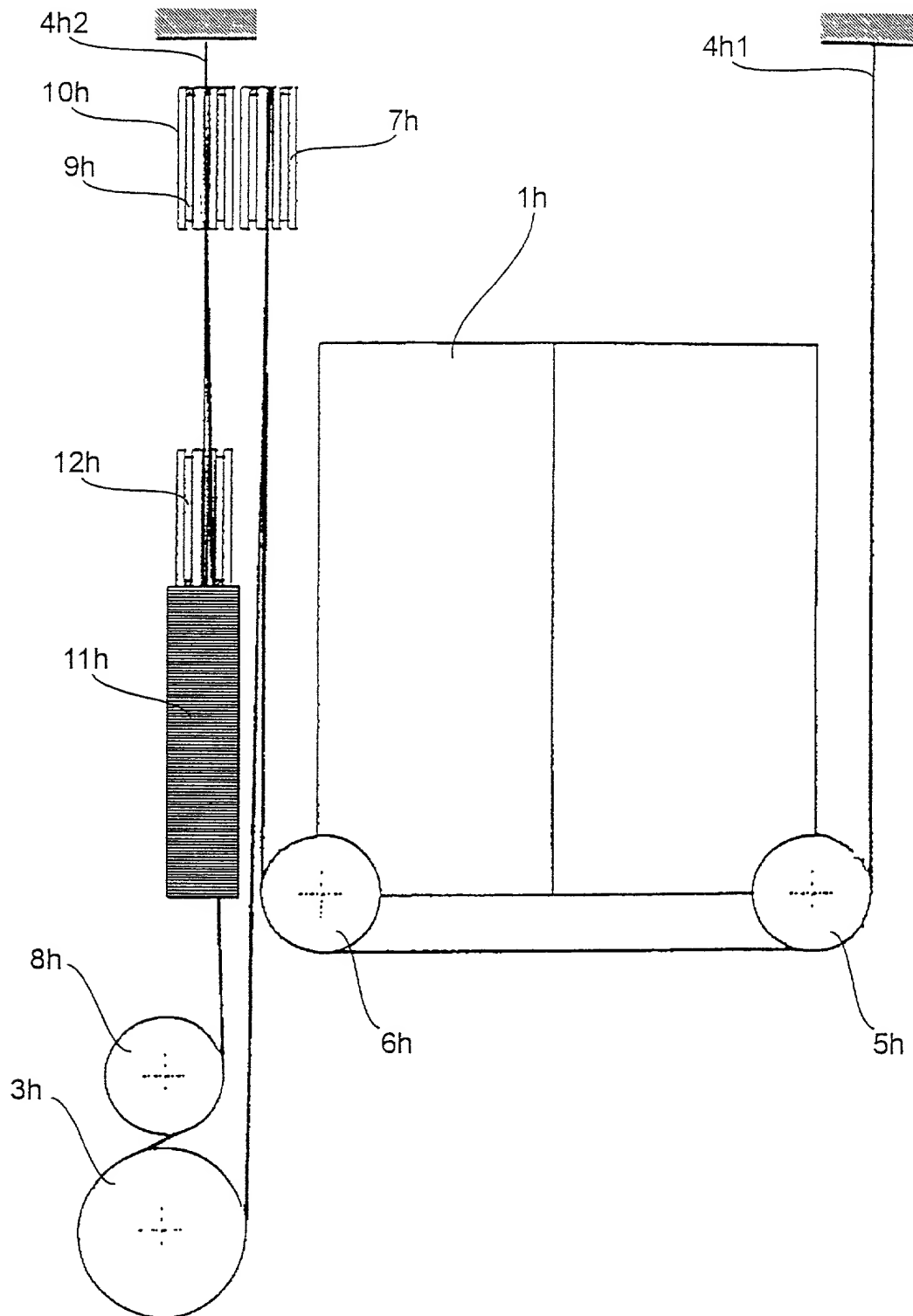


Fig. 10

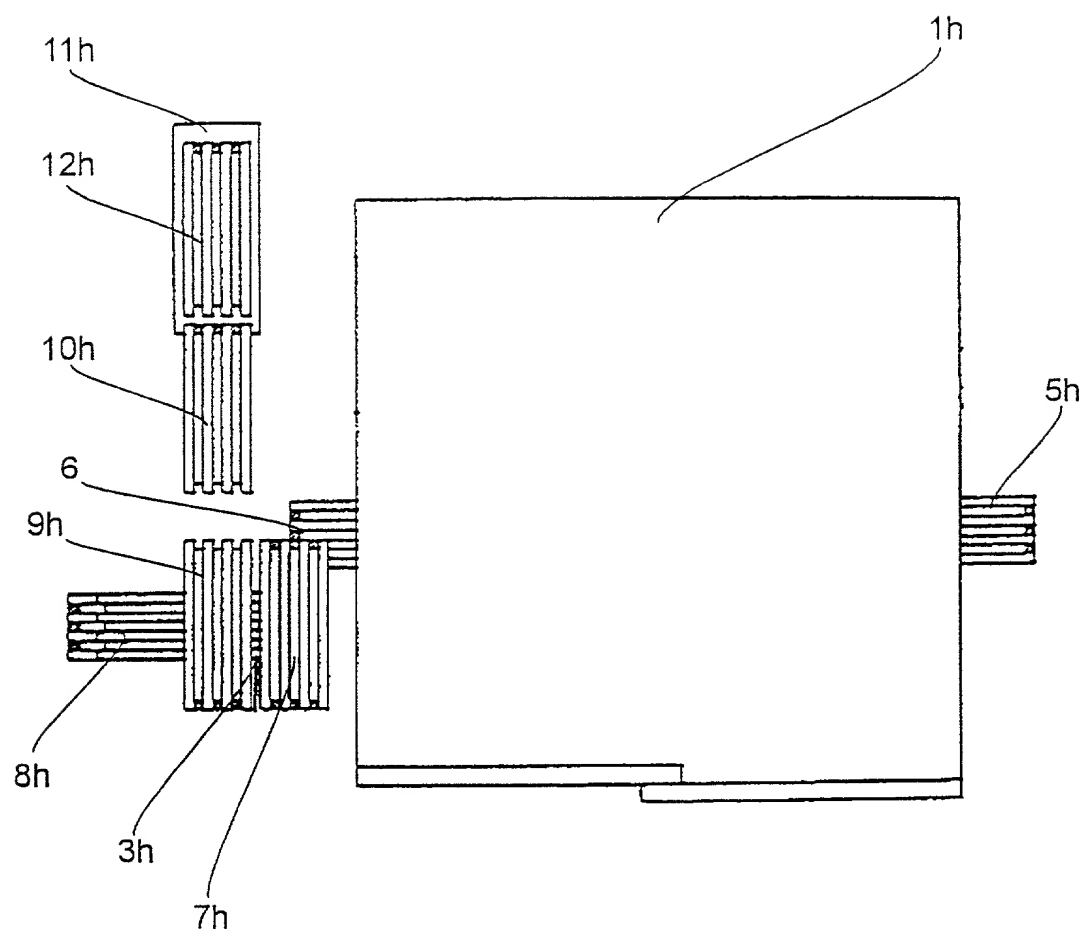


Fig. 11

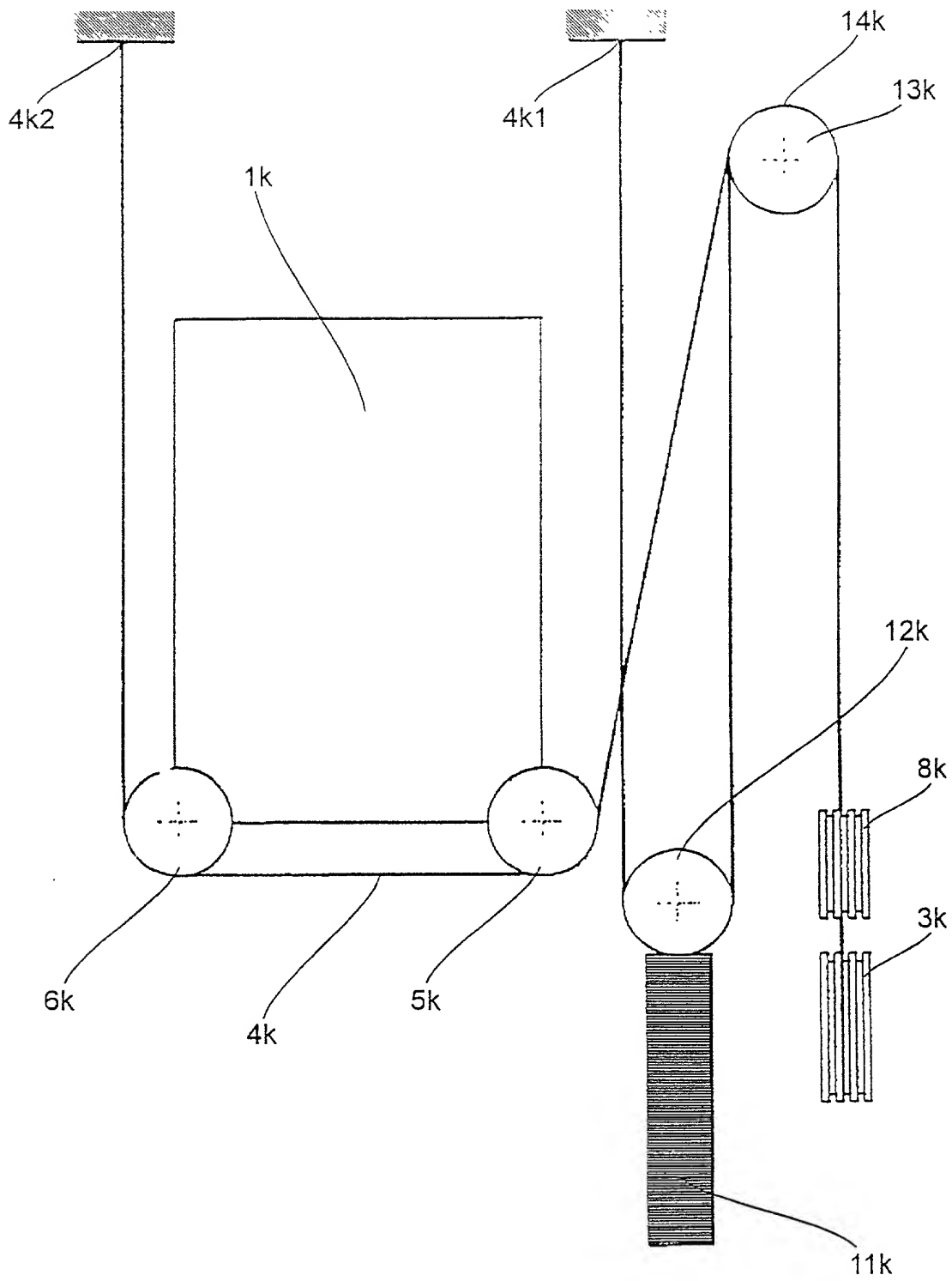


Fig. 12

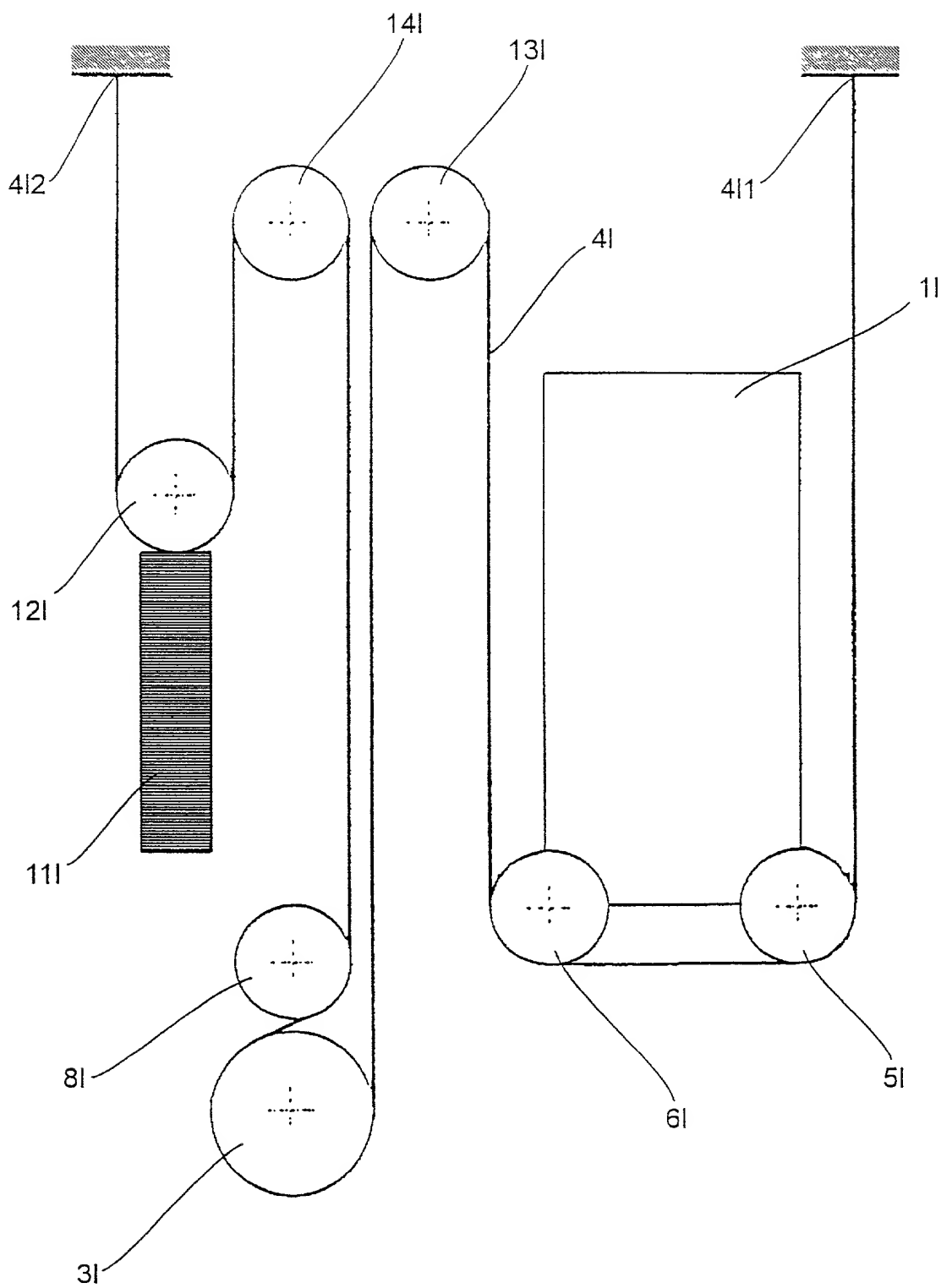


Fig. 13

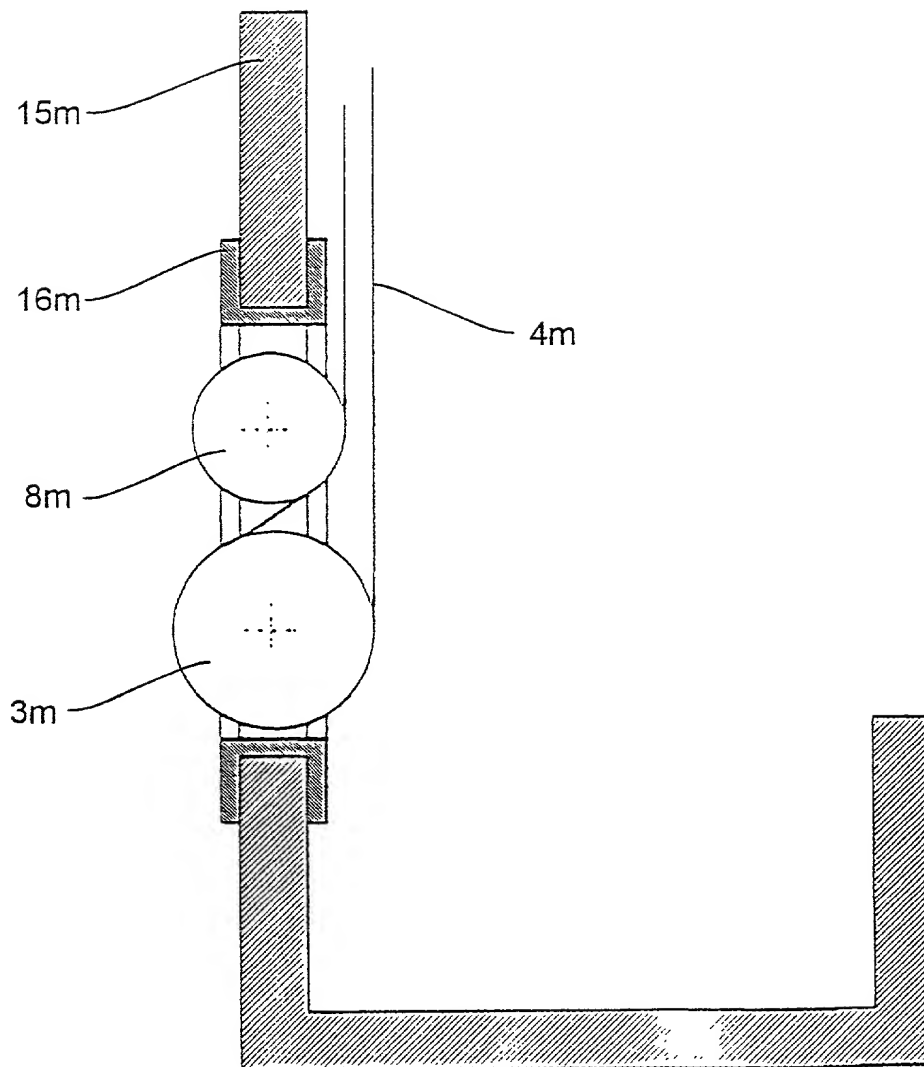


Fig. 14

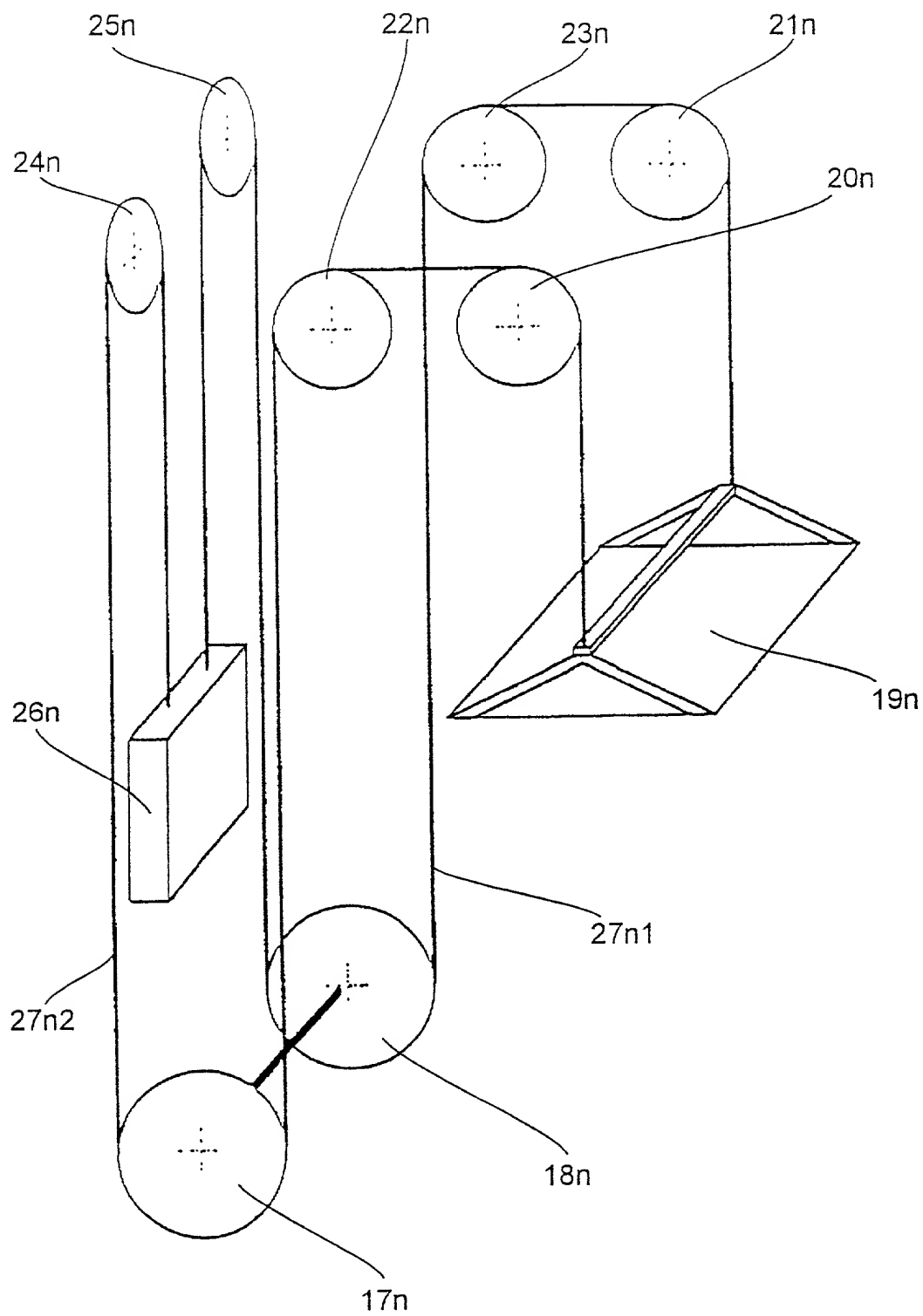




Fig. 15

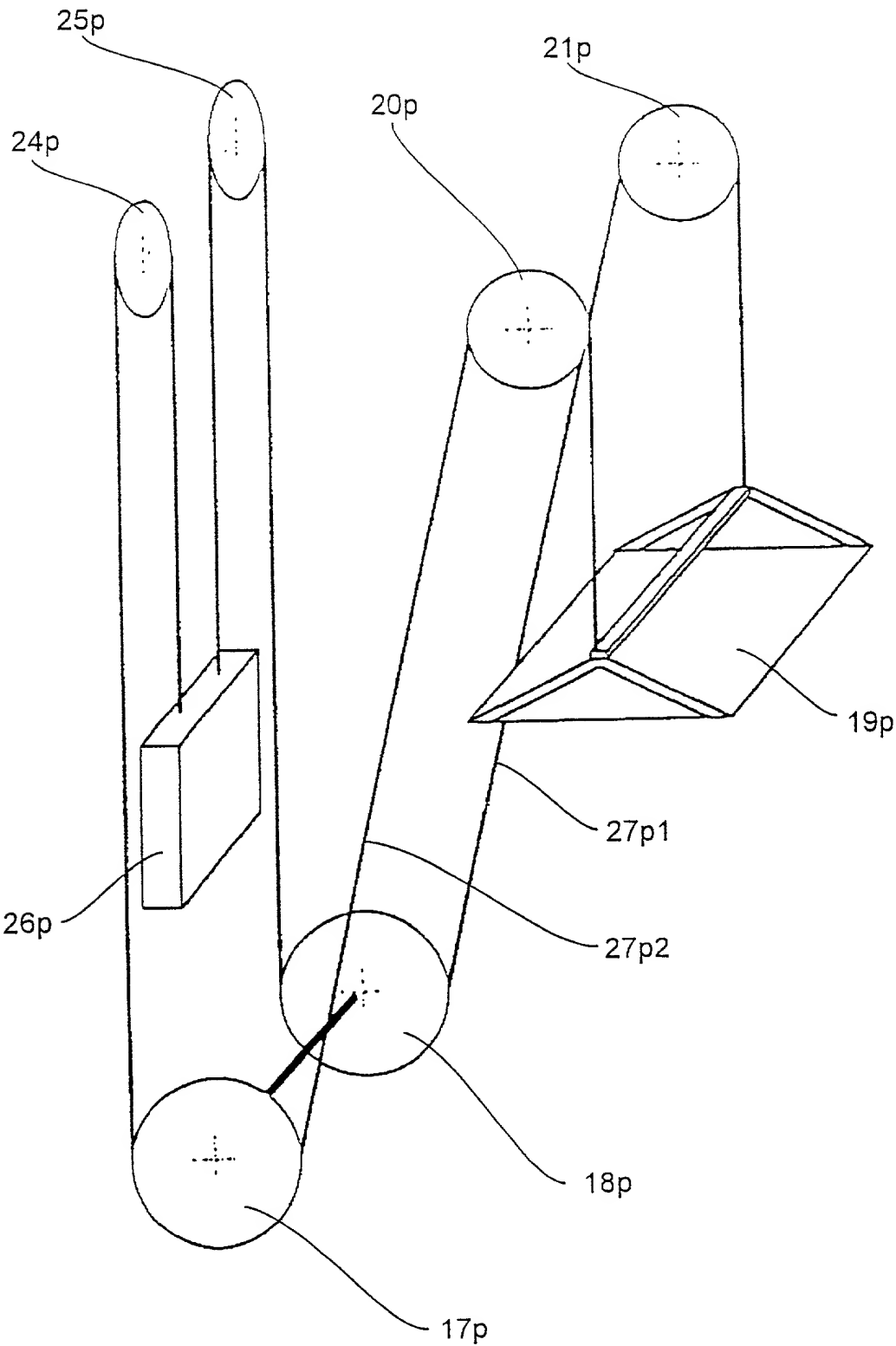


Fig. 16

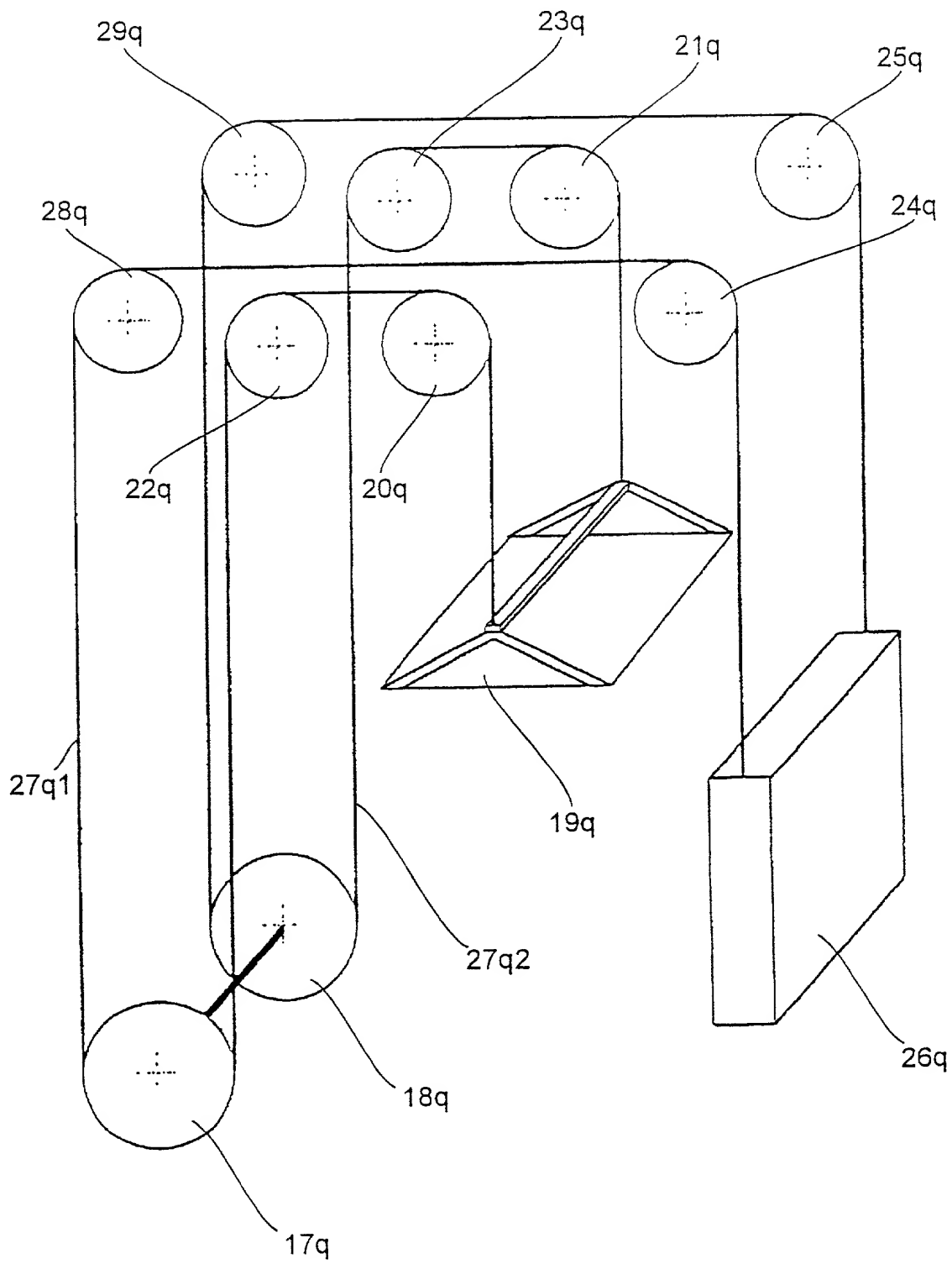
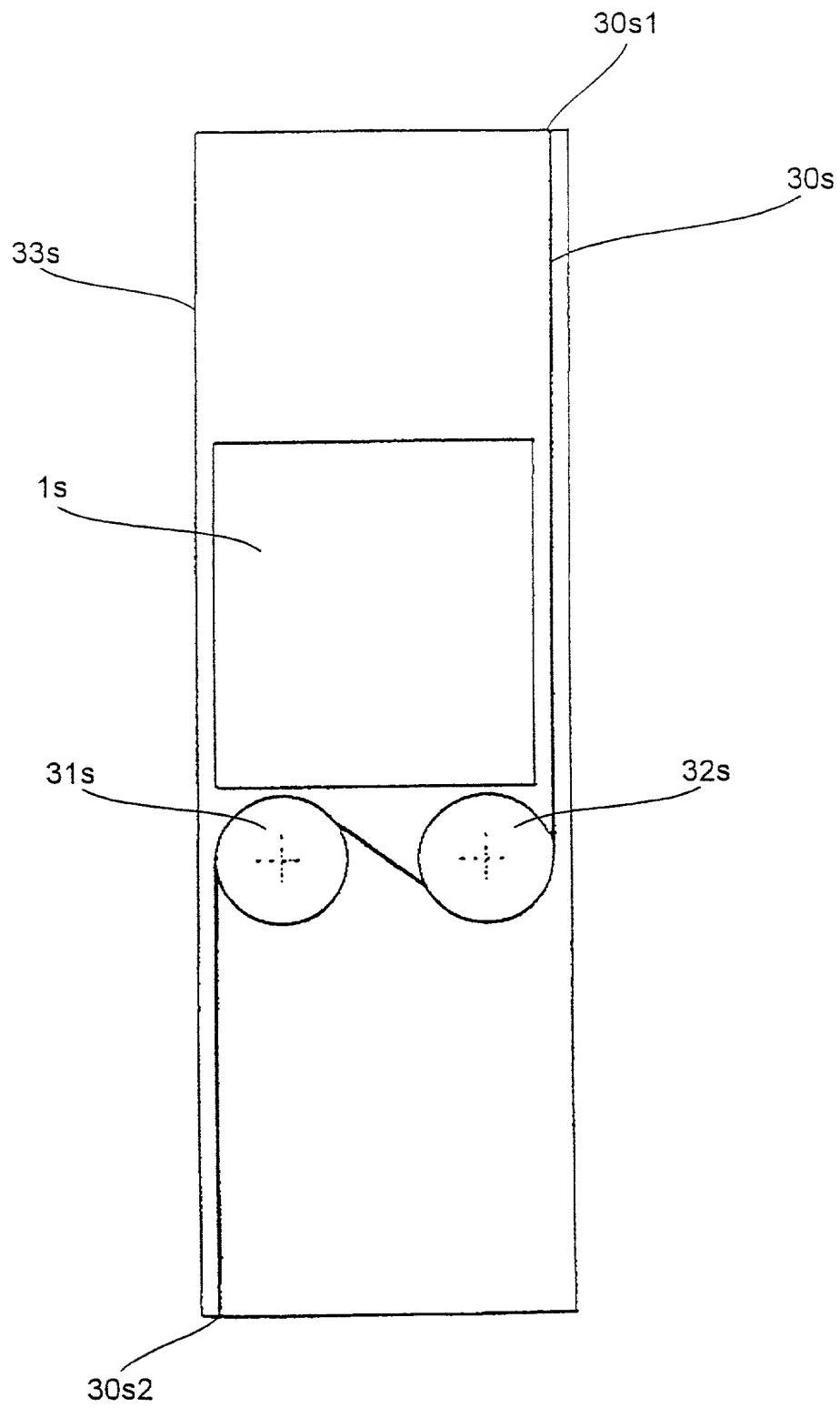


Fig. 17



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NR. 969 002

+49 8134 18108 S.02

0002

Attorney's Docket No.: 11594-002001

Client's Ref. No.: F 75056 US

## COMBINED DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled **PREFASSEMBLED ELEVATOR SHAFT**, the specification of which was filed on April 3, 2000 as Application Serial No. 09/509,926 and amended on April 3, 2000.

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

Country	Application No.	Filing Date	Priority Claimed
PCT	PCT/EP98/06255	October 1, 1998	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Germany	197 52 227.0	November 25, 1997	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Germany	197 43 513.0	October 1, 1997	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

I acknowledge the duty to disclose all information I know to be material to patentability in accordance with Title 37, Code of Federal Regulations, §1.56.

I hereby appoint the following attorneys and/or agents to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

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225 Franklin Street  
Boston, MA 02110-2804

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patents issued thereon.

NR. 969 003

+49 8134 18108 S.03

003

Attorney's Docket No.: 11594-002001  
Client's Ref. No.: P 75056 US

**Combined Declaration and Power of Attorney**  
Page 2 of 2 Pages

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Date: 15.6.2000

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